## CLAIMS

1. A picture coding method for coding a picture on a block-by-block basis through orthogonal transformation and quantization, and coding a quantization matrix that is used to derive quantization steps for frequencies of orthogonal transformation coefficients, the method comprising:

calculating a difference value between each of frequency components included in the quantization matrix and a predetermined value corresponding to said each of the frequency components; and

coding the difference value into a variable length code,

wherein a code length of the variable length code is shorter as the difference value is smaller, or equal to a code length of a neighboring difference value of said difference value.

2. The picture coding method according to Claim 1,

wherein the predetermined value is a value of a frequency component corresponding to an immediately previous difference value.

3. The picture coding method according to Claim 2,

wherein difference values are calculated in order from low frequencies to high frequencies of the frequency components included in the quantization matrix.

4. The picture coding method according to Claim 3,

wherein each of the difference values is represented as a remainder of 2 raised to a power of k (k is a constant).

5. The picture coding method according to Claim 3, further comprising:

judging whether or not there exist consecutive difference

values 0 corresponding to a latter part of the quantization matrix; and

coding difference values up to an immediately previous difference value of a top difference value 0 into variable length codes, when the judgment is that there exist consecutive difference values 0, without coding the consecutive difference values 0 into variable length codes.

6. The picture coding method according to Claim 5, further comprising

adding an end code after the variable length code of the immediately previous difference value of the top difference value 0.

7. A picture decoding method for decoding a coded picture on a block-by-block basis through inverse quantization and inverse orthogonal transformation, and decoding a variable-length coded quantization matrix, the method comprising:

variable-length decoding the quantization matrix into a difference value corresponding to each of frequency components included in said quantization matrix; and

calculating each of the frequency components of the quantization matrix by adding the difference value to a predetermined value corresponding to said each of the frequency components,

wherein a code length of a variable length code of the difference value is shorter as the difference value is smaller, or equal to a code length of a neighboring difference value of said difference value.

8. The picture decoding method according to Claim 7,

wherein the predetermined value is a value of a frequency component that is calculated by an immediately previous addition.

9. The picture decoding method according to Claim 8,

wherein additions are performed in order from low frequencies to high frequencies of the frequency components included in the quantization matrix.

10. The picture decoding method according to Claim 9,

wherein each of the frequency components is represented as a remainder of 2 raised to a power of k (k is a constant).

11. The picture decoding method according to Claim 9,

wherein in the case where an end code is detected from the variable-length coded quantization matrix, a value that is the same as a value of an immediately previous frequency component of the end code is outputted as a value of each of the subsequent frequency components.

12. A picture coding apparatus for coding a picture on a block-by-block basis through orthogonal transformation and quantization, and coding a quantization matrix that is used to derive quantization steps for frequencies of orthogonal transformation coefficients, the apparatus comprising:

a subtraction unit operable to calculate a difference value between each of frequency components included in the quantization matrix and a predetermined value corresponding to said each of the frequency components; and

a coding unit operable to code the difference value into a variable length code,

wherein a code length of the variable length code is shorter as the difference value is smaller, or equal to a code length of a neighboring difference value of said difference value.

13. The picture coding apparatus according to Claim 12,

wherein the predetermined value is a value of a frequency component corresponding to an immediately previous difference value.

14. The picture coding apparatus according to Claim 13,

wherein the subtraction unit calculates difference values in order from low frequencies to high frequencies of the frequency components included in the quantization matrix.

15. The picture coding apparatus according to Claim 14,

wherein each of the difference values is represented as a remainder of 2 raised to a power of k (k is a constant).

16. The picture coding apparatus according to Claim 14, further comprising

a judgment unit operable to judge whether or not there exist consecutive difference values 0 corresponding to a latter part of the quantization matrix,

wherein the coding unit codes difference values up to an immediately previous difference value of a top difference value 0 into variable length codes, when the judgment unit judges that there exist consecutive difference values 0, without coding the consecutive difference values 0 into variable length codes.

17. The picture coding apparatus according to Claim 16,

wherein the coding unit further adds an end code after the variable length code of the immediately previous differential value of the top difference value 0.

18. A picture decoding apparatus for decoding a coded picture on a block-by-block basis through inverse quantization and inverse

orthogonal transformation, and decoding a variable-length coded quantization matrix, the apparatus comprising:

a decoding unit operable to variable-length decode the quantization matrix into a difference value corresponding to each of frequency components included in said quantization matrix; and

an addition unit operable to calculate each of the frequency components of the quantization matrix by adding the difference value to a predetermined value corresponding to said each of the frequency components,

wherein a code length of a variable length code of the difference value is shorter as the difference value is smaller, or equal to a code length of a neighboring difference value of said difference value.

19. The picture decoding apparatus according to Claim 18,

wherein the predetermined value is a value of a frequency component that is calculated by an immediately previous addition by the addition unit.

20. The picture decoding apparatus according to Claim 19,

wherein the addition unit carries out additions in order from low frequencies to high frequencies of the frequency components included in the quantization matrix.

21. The picture decoding apparatus according to Claim 20,

wherein each of the frequency components is represented as a remainder of 2 raised to a power of k (k is a constant).

22. The picture decoding apparatus according to Claim 21, further comprising:

a holding unit operable to hold an immediately previous frequency component calculated by the addition unit; and

a detection unit operable to detect an end code from the variable-length coded quantization matrix,

wherein in the case where the detection unit detects an end code, the holding unit outputs a value that is the same as a value of an immediately previous frequency component of the end code, as a value of each of the subsequent frequency components.

23. A program that causes a computer to execute a picture coding method for coding a picture on a block-by-block basis through orthogonal transformation and quantization, and coding a quantization matrix that is used to derive quantization steps for frequencies of orthogonal transformation coefficients, the program causing the computer to execute the following included in the picture coding method:

calculating a difference value between each of frequency components included in the quantization matrix and a predetermined value corresponding to said each of the frequency components; and

coding the difference value into a variable length code,

wherein a code length of the variable length code is shorter as the difference value is smaller, or equal to a code length of a neighboring difference value of said difference value.

24. A program that causes a computer to execute a picture decoding method for decoding a coded picture on a block-by-block basis through inverse quantization and inverse orthogonal transformation, and decoding a variable-length coded quantization matrix, the program causing the computer to execute the following included in the picture decoding method:

variable-length decoding the quantization matrix into a difference value corresponding to each of frequency components included in said quantization matrix; and

calculating each of the frequency components of the quantization matrix by adding the difference value to a predetermined value corresponding to said each of the frequency components,

wherein a code length of a variable length code of the difference value is shorter as the difference value is smaller, or equal to a code length of a neighboring difference value of said difference value.

25. A semiconductor device for coding a picture on a block-by-block basis through orthogonal transformation and quantization, and coding a quantization matrix that is used to derive quantization steps for frequencies of orthogonal transformation coefficients, the device comprising:

a subtraction unit operable to calculate a difference value between each of frequency components included in the quantization matrix and a predetermined value corresponding to said each of the frequency components; and

a coding unit operable to code the difference value into a variable length code,

wherein a code length of the variable length code is shorter as the difference value is smaller, or equal to a code length of a neighboring difference value of said difference value.

26. A semiconductor device for decoding a coded picture on a block-by-block basis through inverse quantization and inverse orthogonal transformation, and decoding a variable-length coded quantization matrix, the device comprising:

a decoding unit operable to variable-length decode the quantization matrix into a difference value corresponding to each of frequency components included in said quantization matrix; and

an addition unit operable to calculate each of the frequency

components of the quantization matrix by adding the difference value to a predetermined value corresponding to said each of the frequency components,

wherein a code length of a variable length code of the difference value is shorter as the difference value is smaller, or equal to a code length of a neighboring difference value of said difference value.